UNDERSTANDING HEALTHCARE SIGNAGE PREFERENCES AND EFFECTIVENESS: A SURVEY OF MEDICAL STAFF AND ELDERLY RESIDENTS IN KOTA KINABALU

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ABSTRACT

Hospital signage systems are being assessed for patient guidance. Healthcare signage must be functional to help patients, visitors, and staff navigate medical facilities. The respondents' medical expertise and medical terminology are used to analyse their perceptions of healthcare signs. A thorough analysis of 500 survey participants' preferences and proposals for enhancing healthcare signage, especially in Kota Kinabalu hospitals, was conducted. This survey comprised medical professionals and the general people, both medically literate and untrained. The results showed that text and symbols were the most popular signage type. Those with medical knowledge also knew more English medical terms. Medical professionals were more familiar with such terms. Most responders followed signs and asked for directions around the facility. Many respondents were confused if existing signage could help the blind or illiterate. Despite this confusion, respondents found hospital signs clear and well-placed. However, they proposed adding more symbols, colours, standardised designs, simple vocabulary, and temporary signage to improve efficacy, simplicity, visibility, standardisation, and nomenclature. A study found that enhancing visual contrast, readability, and simplicity improves hospital signage for users. It offers suggestions for improving hospital signage to serve varied patient groups.

Keywords: Wayfinding, healthcare signage, hospital navigation, signage design, user experience.

INTRODUCTION

Healthcare facilities need effective wayfinding to provide high quality patient care and ensure smooth operations. For first-time visitors, hospitals are often difficult to navigate due to complex building layouts and unfamiliar medical environments (Zimring, 1990). It can be difficult to navigate healthcare facilities, especially for first-time visitors, the elderly, or those with special needs.

These individuals need effective healthcare signage to guide them and ensure a smooth experience. A poor wayfinding design leads to stress, frustration, and disorientation among users, which disrupts care, reduces efficiency, and compromises safety. In healthcare facilities, wayfinding signage enables users to navigate and access appropriate care.

As a result of the complexity of hospital environments, first-time visitors face significant challenges in wayfinding. According to this study, different respondent groups have different perceptions of the effectiveness of healthcare signage, their knowledge of medical terminology, and their suggestions for improvements. A healthcare facility's signage system is an integral part of its wayfinding design.

Individual factors like familiarity with medical terminology and preferences may also influence wayfinding behavior. The use of well-designed signage improves patient experiences by providing clear navigational guidance, guiding users quickly to their destinations, and facilitating an enhanced patient experience (Smitshuijzen, 2007).

In this study, we will evaluate healthcare signage systems' effectiveness, identify problems and areas to improve, and recommend optimal signage designs. The purpose of this study was also to study the perceptions of medical staff and the general public with regard to healthcare signage in Kota Kinabalu, Malaysia.

OBJECTIVES

(a) To assess user preferences for different types of healthcare signage.
(b) To analyze user perceptions of existing healthcare signage.
(c) To provide recommendations for enhancing the effectiveness of healthcare signage.

LITERATURE REVIEW

Wayfinding includes both orienting oneself and navigating oneself through physical spaces (Passini, 1984). A sense of control, reduced anxiety, and improved user experience is achieved by wayfinding in unfamiliar built environments like hospitals (Zimring, 1990). Orientation and

navigation are ways people use to orient themselves and move between locations (Passini, 1984), and architectural cues, signage, and human perception play a critical role in wayfinding.

Users need effective wayfinding to access healthcare services in a timely manner in healthcare environments. It is, however, extremely difficult for newcomers to find their way around complex health facilities with extensive corridors, departments, and intersections (Huelat, 2007). It is important to have signage that provides easily interpreted information when implementing a wayfinding scheme (Arthur & Passini, 1992).

Wayfinding aids such as signage provide navigational cues to aid decision-making. A well-designed signage system enhances accessibility and the user experience in hospitals. In addition to text, symbols, and tactile elements, signage can also incorporate multimodal elements to serve a wide range of users (Jensen, 2011, Jasni et al, 2023). Effective signage systems must be visible, legible, simple, and readable. The use of combination text and symbols by medical staff and general users is influenced by user factors as well (Alvarsson et al., 2010).

It has been found that medical jargon on signs can be difficult to comprehend for laypeople. User factors also influence wayfinding. (Roy et al., 2016) The familiarity of medical terminology affects understanding of health information. User preferences also impact wayfinding. In contrast to text-only signs, symbols alone risk ambiguity. Combined symbol and text improve comprehensibility. Strategically placed signage at decision points (Arthur & Passini, 1992) improves wayfinding efficiency.

In order to confirm arrival at a destination, directional signs should be provided at intersections to indicate possible routes. Users who are familiar with medical jargon will be able to better understand healthcare signage. Non-medical users may be unfamiliar with the terminology at differing levels, while medical staff are highly familiar. Even with signage, first-time visitors may find it difficult to navigate unfamiliar facilities. Users in healthcare facilities often ask directions, follow others, or try out things because they are unfamiliar (Zimring, 1990).

They become increasingly dependent on signage as they experience and repeat visits. First-time visitors can navigate the complex with a map and guide. Through feedback from users, wayfinding can be improved by tailoring signage to their preferences and needs. Understanding user perceptions of existing signage reveals opportunities for improvement (Reiling, 2006, Jasni etl al, 2023). User surveys and feedback highlight issues from users' perspectives. Thus, users' needs can be taken into account when designing wayfinding, and periodic evaluations enable systematic improvements.

METHODOLOGY & FINDINGS

In the survey, 500 respondents were surveyed, including 104 medical staff at the Queen Elizabeth Hospital Kota Kinabalu. There were 396 general public elderly respondents from

various districts of Kota Kinabalu, including Luyang, Likas, Menggatal, Sepanggar, Api-Ap, Kepayan, and Tanjung Aru (Figure 1). Luyang had the highest number of respondents. The respondents chose between symbols alone, text only, or symbols with text as their preferred signage design.

On a 5-point Likert scale, familiarity with English medical terminology was assessed on a three-point scale. Perceptions of existing signage's value for visually impaired or illiterate users were evaluated from "Strongly disagree" to "Strongly agree." Using wayfinding approaches of first-time visitors, we determined if they sought directions, used signage, or used both. Using a 5-point scale, 7 items were rated from "Very bad" to "Very good" to assess signage quality. An open-ended feedback questionnaire was also used to collect suggestions for improvements. The survey data was analyzed using SPSS using descriptive statistics, cross-tabulations, and chi-square tests.

Figure 1. Respondents during survey completion (images used with permission)

RESULTS

In Table 1, according to the medical knowledge distribution of the 500 respondents surveyed, 20.8% (104 individuals) were medical employees, while 12% (60 individuals) were general

public. Medical knowledge was not widely known by 67.2% (336 individuals) of the general public.

As far as gender representation goes, females made up 86.5% (90 out of 104 medical staff members), while males made up 13.5% (14 out of 104). A majority of the general public with medical knowledge (39 out of 60) were male, while 61.3% (206 out of 336) was made up of females, while 38.7% (130 out of 336) were made up of males.

A deeper dive into age distribution reveals that the 50-59 age bracket primarily consists of members of the general public without medical expertise. Compared with older groups, medical staff were more prevalent among 25-29 and 30-39 year olds. There were no medical professionals among the 60-69 age group.

Looking at ethnicity, Malaysians accounted for 24.8% (124 individuals), while Chinese accounted for 35.8% (179 individuals). It is noteworthy that a significant number of those categorized as 'Other' were medical staff, making Indians 5.6% (28 individuals) and 'Others' 33.8% (169 individuals) ethnic groups.

The Malay reading proficiency was the most prevalent across all categories, with medical staff from all ages demonstrating 100% proficiency in the language. Malay reading proficiency, however, decreased significantly as the age of the Chinese ethnic group increased.

It was observed that 14.1% (56 individuals) of the 396 respondents (excluding medical staff) had an education level below a diploma when analyzing their education levels. Among the respondents aged 50-59, the majority had a degree (54%) while 31.8% had a diploma or pre-university qualification (126 individuals).

Table 1. The respondents' particulars

The medical knowledge structure of the respondents		
Respondents' medical knowledge	n=500	% Within respondent
Medical staff - with medical knowledge	104	20.8%
General public - with medical knowledge	60	12.0%
General public - no medical knowledge	336	67.2%

The gender structure of the respondents				
Gender	**Medical staff**	**General public - with medical knowledge**	**General public - no medical knowledge**	**Total (n=500)**
Male	14 13.5%	39 65%	130 38.7%	183 36.6%
Female	90 86.5%	21 35%	206 61.3%	317 63.4%

Respondents by age				
Age	**Medical staff**	**General public - with medical knowledge**	**General public - no medical knowledge**	**Total (n=500)**
50 - 59	16 15.4%	45 75.0%	169 50.3%	230 46.0%
60 - 69	0 0.0%	15 25.0%	113 33.6%	128 25.6%

Over 70	0 0.0%	0 0.0%	54 16.1%	54 10.8%
25 - 29	24 23.1%	0 0.0%	0 0.0%	24 4.8%
30 - 39	52 50.0%	0 0.0%	0 0.0%	52 10.4%
40 - 49	12 11.5%	0 0.0%	0 0.0%	12 2.4%

Respondents by ethnicity

Ethnicity	**Medical staff**	**General public - with medical knowledge**	**General public - no medical knowledge**	**Total (n=500)**
Malay	20 19.2%	15 25.0%	89 26.5%	124 24.8%
Chinese	4 3.8%	11 18.3%	164 48.8%	179 35.8%
Indian	0 0.0%	6 10.0%	22 6.5%	28 5.6%
Other	80 76.9%	28 46.7%	61 18.2%	169 33.8%

Language proficiency and ethnicity of respondents in different age groups

Language proficiency	**Ethnicity of the total respondents (n=500)**	
Language Malay	421	37.4%
Language Chinese	228	20.2%
Language English	359	31.9%
Other Language	118	10.5%

Age of respondents	**Language proficiency**	**Ethnicity of the respondents**				
		Malay (n=79)	**Chinese (n=76)**	**Indian (n=14)**	**Other (n=61)**	**Total (n=230)**
50 - 59	Language Malay	79 100.0%	56 73.7%	14 100.0%	61 100.0%	210
	Language Chinese	14 17.7%	65 85.5%	0 0.0%	28 45.9%	107
	Language English	49 62.0%	62 81.6%	10 71.4%	41 67.2%	162
	Language Other	20 25.3%	12 15.8%	7 50.0%	18 29.5%	57

Age of respondents	**Language proficiency**	**Ethnicity of the respondents**				
		Malay (n=23)	**Chinese (n=67)**	**Indian (n=12)**	**Other (n=26)**	**Total (n=128)**
60 - 69	Language Malay	23 100.0%	33 49.3%	10 83.3%	26 100.0%	92
	Language Chinese	1 4.3%	58 86.6%	2 16.7%	13 50.0%	74
	Language English	12 52.2%	50 74.6%	7 58.3%	13 50.0%	82
	Language Other	5 21.7%	5 7.5%	8 66.7%	6 23.1%	24

Age of respondents	**Language proficiency**	**Ethnicity of the respondents**				
		Malay (n=6)	**Chinese (n=36)**	**Indian (n=2)**	**Other (n=10)**	**Total (n=54)**
Over 70	Language Malay	6 100.0%	15 41.7%	2 100.0%	8 80.0%	31
	Language Chinese	1 16.7%	32 88.9%	0 0.0%	1 10.0%	34
	Language English	2 33.3%	26 72.2%	2 100.0%	7 70.0%	37
	Language Other	1 16.7%	2 5.6%	1 50.0%	3 30.0%	7

Age of respondents	Language proficiency	Ethnicity of the respondents				
		Malay (n=4)	Chinese (n=0)	Indian (n=0)	Other (n=20)	Total (n=24)
25-29 Medical staff	Language Malay	4 100.0%			20 100.0%	24
	Language Chinese	0 0.0%			4 20.0%	4
	Language English	3 75.0%			19 95.0%	22
	Language Other	0 0.0%			7 35.0%	7
Age of respondents	**Language proficiency**	**Ethnicity of the respondents**				
		Malay (n=8)	**Chinese (n=0)**	**Indian (n=0)**	**Other (n=44)**	**Total (n=52)**
30-39 Medical staff	Language Malay	8 100.0%			44 100.0%	52
	Language Chinese	0 0.0%			9 20.5%	9
	Language English	8 100.0%			40 90.9%	48
	Language Other	2 25.0%			18 40.9%	20
Age of respondents	**Language proficiency**	**Ethnicity of the respondents**				
		Malay (n=4)	**Chinese (n=0)**	**Indian (n=0)**	**Other (n=8)**	**Total (n=12)**
40-49 Medical staff	Language Malay	4 100.0%			8 100.0%	12
	Language English	4 100.0%			4 50.0%	8
	Language Other	1 25.0%			2 25.0%	3

The education structure of the respondents

Educational level	Age of public respondents			Total (n=396)
	50 - 59	60 - 69	Over 70	
Under Diploma	5 2.3%	31 24.2%	20 37.0%	56 14.1%
Diploma or Pre-U	64 29.9%	46 35.9%	16 29.6%	126 31.8%
Degree	145 67.8%	51 39.8%	18 33.3%	214 54.0%

Table 2. Signage preference by medical staff and general public

Signage preference	Medical staff (n= 104)	General public – with medical knowledge (n= 60)	General public – no medical knowledge (n= 336)	Total (n=500)
Only symbol signage	0 0.0%	0 0.0%	12 3.6%	12 2.4%
Only text signage	24 23.1%	6 10.0%	90 26.8%	120 24.0%
Symbol and text signage	80 76.9%	54 90.0%	234 69.6%	368 73.6%
Chi-Square Test				
$\chi 2$ Value		**df**	**Asymptotic Significance (2-sided)**	
14.944		4	0.005	
Symmetric Measures		**Value**	**Approximate Significance**	

Phi (φ)	0.173	0.005
Cramer's V	0.122	0.005
Contingency Coefficient	0.17	0.005

In Table 2, respondents' preferences regarding healthcare signage design are shown. We conducted a cross-tabulation analysis in which 500 respondents were analyzed to examine their medical knowledge and healthcare signage preferences. Different participant groups are shown in the table with their signage preferences, including medical staff with medical knowledge, general public with medical knowledge, and general public without medical knowledge.

A total percentage of each group is provided for each type of sign: only symbol signage, only text signage, and symbol and text signage. It was found that no respondents with medical knowledge preferred only symbol signage, 24 respondents (23.10%) preferred only text signage, and 80 respondents (76.20%) preferred both symbol and text signage. There were no respondents who preferred only symbols for general public with medical knowledge, 6 respondents who preferred only text signs, and 54 respondents who preferred symbol and text signs.

Among the general public with no medical knowledge, 12 respondents (3.60%) preferred only symbol signage, 90 respondents (26.80%) preferred only text signage, and 234 respondents (69.60%) preferred symbol and text signage. Based on the findings, healthcare signage preferences differ based on a participant's medical knowledge. The relationship between signage preference and participant groups was explored using a chi-square test. The results indicated a statistically significant association between medical knowledge and signage preferences $\chi 2 = 14.944$, $df = 4$, $p = .005$.

Additionally, Symmetric measures indicated weak associations Phi (φ) = .173, Cramer's V = .122, Contingency Coefficient = .170. These findings suggest that respondents' medical knowledge is related to their perceptions of healthcare signage, but the effect size of the association is relatively small. Statistically significant associations were found between signage preferences and respondent groups, suggesting that symbol and text signage are the most preferred types among all participants.

Table 3. Familiarity with English medical terminology among medical staff and general public

Familiar with English medical terminology	**Medical staff (n=104)**	**General public - with medical knowledge (n=60)**	**General public - no medical knowledge (n=336)**	**Total (n=500)**
Yes	104 100.0%	60 100.0%	138 41.1%	302 60.4%
No	0 0.0%	0 0.0%	84 25.0%	84 16.8%
Not Sure	0 0.0%	0 0.0%	114 33.9%	114 22.8%

Chi-Square Test		
χ2 Value	**df**	**Asymptotic Significance (2-sided)**
160.005	4	< .001
Symmetric Measures	**Value**	**Approximate Significance**
Phi (φ)	0.566	< .001
Cramer's V	0.4	< .001
Contingency Coefficient	0.492	< .001

Table 3 shows how familiar medical staff and the general public are with English medical terminology. An association between medical knowledge and familiarity with medical terminologies in English was examined using chi-square analysis. A sample of 500 respondents was used in the analysis, with valid data available for all variables.

Three groups of respondents were categorized according to how familiar they were with English medical terminology: "Yes," "No," and "Not Sure." A cross-tabulation table shows how many respondents are familiar with medical terminologies and how many are medically knowledgeable. According to the table, all respondents (n = 104) were familiar with English medical terminology. Similarly, all respondents (100.0%) with medical knowledge (n = 60) reported being familiar with medicine.

138 respondents (41.1%) with no medical knowledge (n = 336) were familiar with it, 84 respondents (25.0%) were unfamiliar, and 114 respondents (33.9%) were unsure. The analysis revealed a significant association between familiarity with medical terminologies in English and medical knowledge. The chi-square tests revealed $\chi2(4) = 160.005$, $p < .001$.

Respondents with medical knowledge were more likely to be familiar with medical terminologies compared to those without medical knowledge, Phi coefficient (φ) was 0.566 ($p < .001$), Cramer's V was 0.4 ($p < .001$), and the Contingency Coefficient was 0.492 ($p < .001$), indicates a moderately strong relationship.

According to these results, respondents' level of familiarity with medical terminologies is influenced by their medical knowledge. A significant correlation exists between respondents' medical knowledge and their familiarity with medical terminologies in English. Compared with those without medical knowledge, those with medical knowledge were more likely to know medical terminologies. It appears that medical knowledge plays a role in understanding and using medical terminology.

Table 4. Respondents' ratings of healthcare signage for guiding visually impaired or illiterate individuals at Kota Kinabalu hospitals

N		Mean	Median	Std. Deviation
Valid	Missing			
500	0	2.83	3	0.947

Respondents' ratings	n=500	% Within respondent
Strongly Agree	36	7.2%
Agree	132	26.4%
Not Sure	248	49.6%
Disagree	50	10%
Strongly Disagree	34	6.8%

Table 4 the sample of 500 respondents, an analysis of healthcare signage in Kota Kinabalu hospitals was conducted to determine whether it guided visually impaired or illiterate patients to specialist clinics effectively. Responses were rated on a Likert scale from "Strongly Agree" to "Strongly Disagree."

In terms of helpfulness of the signage, the average rating was 2.83 (SD = 0.947), with a median rating of 3. A majority of respondents agreed with the statement, with 7.2% strongly agreeing and 26.4% agreeing. 49.6% of respondents were unsure about its effectiveness, while 10% disagreed and 6.8% strongly disagreed. Based on these results, a substantial portion of respondents were concerned about the effectiveness of the existing healthcare signage.

This study suggests that existing healthcare signage at Kota Kinabalu hospitals may not be entirely helpful to those who are visually impaired or illiterate when referring to specialist clinics. A considerable number of respondents disagreed or strongly disagreed about its effectiveness. To better meet the needs of these individuals, improvements to the signage system or alternative solutions may be necessary.

Table 5. The method used to find specialist clinics during the first hospital visit by medical staff and general public

Respondents' comments	Medical staff (n=104)	General public - with medical knowledge (n=60)	General public - no medical knowledge (n=334)	Total (n=498)
Ask someone, don't look at the signage.	8 7.7%	6 10.0%	24 7.2%	38 7.6%
See the signage all the way and go by myself.	24 23.1%	0 0.0%	108 32.3%	132 26.5%
Ask someone and see signage to arrive.	72 69.2%	54 90.0%	202 60.5%	328 65.9%
Chi-Square Test				
χ2 Value	**df**	**Asymptotic Significance (2-sided)**		
28.132	4	< .001		
Symmetric Measures	**Value**	**Approximate Significance**		
Phi (φ)	0.238	< .001		
Cramer's V	0.168	< .001		
Contingency Coefficient	0.231	< .001		

In the crosstabulation Table 5 the respondents' level of medical knowledge is correlated with the method used to find specialty clinics during their first visit to the hospital. There are three types of respondents in the table: medical staff, general public, and non-medical public.

Most medical staff (69.2%) reported seeing signage and asking someone when arriving at specialist clinics. Compared to 7.7% who asked someone without looking at the signage, 23.1% preferred to read the signage all the way and go independently. In the general public with medical knowledge, 90.0% relied on asking someone and seeing signs, while a smaller percentage (10.0%) asked someone without seeing signs.

The most common method used by people without medical knowledge (60.5%) was to ask someone and look at the signage, followed by asking someone without looking at the signage (7.2%) and looking at the signage all the way and going on their own (32.3%).

The chi-square tests revealed statistically significant associations between the method of finding specialist clinics and respondents' level of medical knowledge ($\chi^2 = 28.132$, df = 4, $p < 0.001$). Symmetric measures were calculated to assess the strength of association. The Phi coefficient showed a moderate association between the method of finding clinics and medical knowledge (Phi = 0.238, $p < 0.001$).

Cramer's V indicated a similar moderate association (V = 0.168, $p < 0.001$). In addition, the Contingency Coefficient indicated a moderate correlation (Contingency Coefficient = 0.231, p = 0.001). This study suggests that the level of medical knowledge of the respondents affects the method used to locate specialist clinics during their first hospital visit.

The general public with medical knowledge also follows a similar pattern, asking someone and seeing signage is more common among medical staff. Those without medical knowledge, on the other hand, are more likely to ask someone to show them the signage, but they also rely on seeing it on their own. According to these findings, medical knowledge influences how people navigate in hospitals.

Table 6. Frequency statistics of respondents' evaluation of existing healthcare signages in Kota Kinabalu

Respondents' ratings	N		Mean	Median	Std. Deviation	Range
	Valid	Missing				
Signage Positioning: Signage is positioned to help you get to your destination easily.	500	0	3.7	4	0.859	4
Words and Meanings: The words and meanings used on the signage are easy to understand.	500	0	3.84	4	0.783	4
Visibility - Colour:	500	0	3.49	3	0.85	3

Signage is visible from a distance (colour contrast between text and signage).						
Visibility - Text Size: Signage is visible from a distance (text and signage are large enough).	500	0	3.63	4	0.787	3
Easy to Read - Capital: The letters used on the signage are easy to read (only the letters are capitalised).	500	0	3.68	4	0.883	4
Easy to Read - Upper/Lower: The letters used on the signage are easy to read (upper and lower case letters).	500	0	3.78	4	0.771	4
Signage Height: Signage is positioned at the right height for your height.	500	0	3.72	4	0.831	4

Respondents' ratings	**Very Bad**	**Bad**	**Not Sure**	**Good**	**Very Good**
Signage Positioning: Signage is positioned to help you get to your destination easily.	12 2.4%	10 2%	178 35.6%	214 42.8%	86 17.2%
Words and Meanings: The words and meanings used on the signage are easy to understand.	6 1.2%	12 2.4%	126 25.2%	266 53.2%	90 18%
Visibility – Colour: Signage is visible from a distance (colour contrast between text and signage).	0 0%	56 11.2%	206 41.2%	176 35.2%	62 12.4%
Visibility - Text Size: Signage is visible from a distance (text and signage are large enough).	0 0%	28 5.6%	198 39.6%	206 41.2%	68 13.6%
Easy to Read - Capital: The letters used on the signage are easy to read (only the letters are capitalised).	6 1.2%	36 7.2%	156 31.2%	216 43.2%	86 17.2%
Easy to Read - Upper/Lower: The letters used on the signage are easy to read (upper and lower case letters).	6 1.2%	10 2%	148 29.6%	258 51.6%	78 15.6%
Signage Height: Signage is positioned at the right height for your height.	12 2.4%	6 1.2%	172 34.4%	230 46%	80 16%

Table 6 to analyze the perception of healthcare signage among different groups based on their medical knowledge, descriptive statistics were used. There were 500 responses. According to the mean ratings for healthcare signage, the signage is positioned to make it easy for you to reach your destination: M = 3.70, SD = 0.859.

The signage uses easy-to-understand words and meanings: M = 3.84, SD = 0.783. “Signage is visible from a distance (colour contrast between text and signage)”: M = 3.49, SD = 0.850. “Signage is visible from a distance (text and signage are large enough)”: M = 3.63, SD = 0.787. “The letters used on the signage are easy to read (only the capital letters)”: M = 3.68, SD = 0.883.

“Signage is placed at the right height for your height”: M = 3.72, SD = 0.831. “Signage is visible from a distance.”: M = 3.72, SD = 0.831. As a result of these results, the respondents

rated the signage positively in all aspects, with mean scores ranging from 3.49 to 3.84 on a Likert scale from 1 to 5.

In the survey, the highest mean rating was given to "The words and meanings used on the signage are easily understandable" (M = 3.84), whereas the lowest mean rating was given to "Signage is visible from a distance (colour contrast between text and signage)" (M = 3.49).

In terms of frequency distribution, the majority of respondents rated the signage as "Good" (42.8%) or "Very Good" (17.2%) for "Signage is positioned to help you get to your destination easily." Similarly, the majority rated the signage as "Good" (53.2%) for "The words and meanings used on the signage are easy to understand."

However, for "Signage is visible from a distance (colour contrast between text and signage)," a significant proportion of respondents were unsure (41.2%) about their perception. According to the findings, healthcare signage is perceived positively by most respondents, particularly regarding its simplicity to understand and its position to help people get to their destinations.

The visibility and capitalization of letters, however, could be improved. It was suggested that simplicity, visibility, standardization, terminology, and communication of temporary signage be enhanced in open-ended feedback. According to respondents, current signage is moderately effective, but the accessibility, visibility, and suitability of the signs for first-time visitors without medical knowledge are concerns. Inclusion, accessibility, standardization, and enhanced visibility were among the recommendations.

DISCUSSION

The results of this study revealed the needs and preferences of medical staff and the general public in Kota Kinabalu in terms of healthcare signage. Based on the medical knowledge of the users, some differences emerged. A small percentage of individuals without medical knowledge preferred symbols alone, while those with medical knowledge preferred text-symbol signage. In light of this, symbols alone may not provide adequate information for unfamiliar users.

Adding text ensures clarity, but a small portion of the nonmedical knowledge group still preferred only symbols. Including symbols as a supplement to text meets diverse preferences while optimizing clarity, but incorporating 100% symbol signage is not advisable as it risks ambiguity for unfamiliar users. A greater understanding of medical terminology was strongly correlated with medical knowledge.

Hence, it is important to minimize jargon and use plain language on public signage so that diverse users can understand the information (Zimring, 1990). As 41% of non-medical participants were still familiar with scientific terms, some scientific terms may be entering the public lexicon. Research has indicated medical jargon hinders comprehension for general users.

Diverse users can, however, be more easily understood if jargon is reduced and unavoidable technical terms are defined.

First-time users sought directions along with using signage during initial visits, confirming previous findings (Zimring et al., 2005) that first-time users rely more on staff than signage due to unfamiliarity. Signage usage may increase with repeated exposure. First-timers need proper orientation. For inclusive wayfinding, it is important to have pedestrian signage that accommodates the visually impaired and illiterate.

Nevertheless, this study found ambivalent perceptions about the usefulness of current signage for these groups. While 33.6% agreed it was beneficial, 16.8% disagreed, and nearly half were uncertain. Adding tactile, braille, auditory, and pictographic elements could improve accessibility, but more research is required on specific challenges and needs.

It was difficult for many respondents to navigate their first visits, with many using signage but also seeking assistance. As reported by Huelat (2007), newcomers have difficulty navigating complex facilities (Huelat, 2007). It is possible to help novice users by improving visibility, consistency, positioning at decision points, and integrating architectural cues and technology.

According to respondents, hospital signage is understood well, but is less visible. By enhancing visual contrast through typography, colors, lighting, and scale, users may be more drawn to it (Reiling, 2006; Jasni et al, 2023). Providing periodic user feedback can help refine the product. (Jensen, 2011) recommends readable, visible signs positioned strategically, aligned with calls for simpler terminology and improved visibility. Data-driven signage improvements cater to needs as a result of the findings.

CONCLUSION

Using the perspective of hospital users in Kota Kinabalu, this study sheds light on how healthcare wayfinding can be improved. It becomes increasingly important to design signage that is human-centered to ensure intuitive, inclusive, and empowerment for all hospital users as hospital environments become more complex.

According to our findings, signage that caters to a wide range of users blends text and symbols. In spite of the positive feedback on the current signage, it was clear that the level of medical knowledge of the users influenced their understanding and wayfinding strategies. In spite of the overall satisfaction with current signs, there are clear areas for improvement.

This underscores the importance of minimizing medical jargon in order to make signs universally comprehensible. A number of key recommendations include integrating symbols with concise text for clarity, strategically placing signs at pivotal decision points to help users navigate, incorporating color, font, and lighting to maximize visual contrast, introducing

bilingual signs to appeal to multicultural patients, and using plain language to make things easier for those unfamiliar with medical terms.

The importance of providing orientation tools like maps, and conducting frequent user feedback sessions to continuously refine signage design, cannot be overstated. It emphasizes the importance of robust healthcare wayfinding systems by providing a holistic view of user feedback. The insights help to create user-centric signage that enhances care quality and accessibility, but there is still room for further research.

In order to gain a deeper understanding of wayfinding needs across different cultures and socioeconomic backgrounds, more facilities and a broader demographic can be studied. In Part 1, the author analyzed perceptions of healthcare signage. In Part 2, the author examines the perceptions of Hablamos Juntos universal healthcare symbols among residents of Kota Kinabalu.

This subsequent research will focus on enhancing the effectiveness, usability, and relevance of these symbols, which are generally clear with textual descriptions. These subsequent studies will be discussed in a separate article. Providing designers with methodologies and inspiration to elevate healthcare signage design, it fosters a more intuitive, user-friendly healthcare setting that exceeds the needs of the elderly.

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